IN THE SPECIFICATION:

Please amend the specification as follows:

Page 1, amend the paragraph starting in line 5 as follows:

In a manufacturing process using a lithographic projection apparatus, a pattern (e.g., in a mask) is imaged onto a substrate that is at least partially covered by a layer of radiation-sensitive material (resist). Prior to this imaging [[step]], the substrate may undergo various procedures, such as priming, resist coating and a soft bake. After exposure, the substrate may be subjected to other procedures, such as a post-exposure bake (PEB), development, a hard bake and inspection of the imaged features. This array of procedures is used as a basis to pattern an individual layer of a device, e.g., an IC. Such a patterned layer may then undergo various processes such as etching, ion-implantation (doping), metallization, oxidation, chemical-mechanical polishing, etc., all intended to finish off an individual layer. If several layers are required, then the whole procedure, or a variant thereof, will have to be repeated for each new layer. Eventually, an array of devices will be present on the substrate (wafer). These devices are then separated from one another by a technique such as dicing or sawing, whence the individual devices can be mounted on a carrier, connected to pins, etc. Further information regarding such processes can be obtained, for example, from the book "Microchip Fabrication: A Practical Guide to Semiconductor Processing," Third Edition, by Peter van Zant, McGraw Hill Publishing Co., 1997, ISBN 0-07-067250-4, incorporated herein by reference.

Page 6, amend the paragraph starting in line 23 as follows:

a radiation system Ex, for supplying a ~~projection~~ beam PB of radiation (e.g., DUV radiation), which in this particular case also comprises a radiation source LA;

Page 6, amend the paragraph starting in line 25 as follows:

a first object table (mask table) MT provided with a mask holder for holding a mask MA (e.g., a reticle), and connected to first positioning [[means]] <u>device</u> for accurately positioning the mask with respect to [[item]] <u>a projection system ("lens")</u> PL;

Page 6, amend the paragraph starting in line 28 as follows:

a second object table (substrate table) WT provided with a substrate holder for holding a substrate W (e.g., a resist-coated silicon wafer), and connected to second positioning [[means]] device for accurately positioning the substrate with respect to [[item]] projection system PL;

Page 6, amend the paragraph starting in line 31 as follows:

[[a]] the projection system ("lens") PL (e.g., a refractive lens system) for imaging an irradiated portion of the mask MA onto a target portion C (e.g., comprising one or more dies) of the substrate W.

Page 7, amend the paragraph starting in line 7 as follows:

The source LA (e.g., an excimer laser) produces ~~a beam of~~ radiation. This [[beam]] radiation is fed into an illumination system (illuminator) IL, either directly or after having traversed a conditioning [[means]] device, such as a beam expander Ex, for example. The illuminator IL may comprise an adjusting [[means]] device AM for setting the outer and/or inner radial extent (commonly referred to as .sigma.-outer and .sigma.-inner, respectively) of the intensity distribution in the beam. In addition, it will generally comprise various other components, such as an integrator IN and a condenser CO. In this way, the beam PB impinging on the mask MA has a desired uniformity and intensity distribution in its cross-section.

Page 7, amend the paragraph starting in line 22 as follows:

The beam PB subsequently intercepts the mask MA, which is held on a mask table MT. Having traversed the mask MA, the beam PB passes through the lens PL, which focuses the beam PB onto a target portion C of the substrate W. With the aid of the second positioning [[means]] device (and interferometric measuring [[means]] device IF), the substrate table WT can be moved accurately, e.g., so as to position different target portions C in the path of the beam PB. Similarly, the first positioning [[means]] device can be used to accurately position the mask MA with respect to the path of the beam PB, e.g., after mechanical retrieval of the mask MA from a mask library, or during a scan. In general, movement of the object tables MT, WT will be realized with the aid of a long-stroke module (~~course~~ coarse positioning) and a short-stroke module (fine positioning), which are not explicitly depicted in FIG. 1. However, in the case of a wafer stepper (as opposed to a step-

and-scan apparatus) the mask table MT may just be connected to a short stroke actuator, or may be fixed.

Page 8, amend the paragraph starting in line 8 as follows:

In scan mode, essentially the same scenario applies, except that a given target portion C is not exposed in a single "flash." Instead, the mask table MT is movable in a given direction (the so-called "scan direction," e.g., the y direction) with a speed v, so that the ~~projection~~ beam PB is caused to scan over a mask image; concurrently, the substrate table WT is simultaneously moved in the same or opposite direction at a speed V Mv, in which M is the magnification of the lens PL (typically, M=1/4 or 1/5). In this manner, a relatively large target portion C can be exposed, without having to compromise on resolution.

Page 8, amend the paragraph starting in line 16 as follows:

FIG. 2 is a flow diagram of a lithographic process of which the present invention may form part. Prior to the exposure [[step]] S4, which may be carried out using a lithographic apparatus such as described above with relation to FIG. 1, a substrate, e.g., a silicon wafer, undergoes a priming [[step]] S1, spin coating [[step]] S2 to coat it with a layer of resist and a soft bake S3 to remove solvents from the resist. After exposure, the wafer undergoes a post-exposure bake S5, a development [[step]] S6 during which the exposed or unexposed resist (depending on whether the resist is positive or negative) is removed and a hard bake S7, prior to an inspection [[step]] S8. The inspection [[step]] S8 includes various different measurements and inspections and according to the invention includes a metrology step described further below. If the wafer passes inspection, a process [[step]] S9 is carried out. This may involve etching the areas of the substrate not covered by resist, deposition of a product layer, metallisation, ion implantation, etc. After the process [[step]] S9 the remaining resist is stripped S10 and a final inspection S11 carried out before the process resumes for another layer. In case a substrate fails an inspection at S8, it may be directed directly to a stripping [[step]] S10 and another attempt to print the same process layer made. Although it is preferred that the inspection step be performed after the hard bake S7, in some instances it may be performed after the post-exposure bake S5 or even directly after exposure S4. The manner in which this may be done is described further below.

Page 9, amend the paragraph starting in line 3 as follows:

In the inspection [[step]] a metrology unit of the type shown in FIG. 3 is used. The metrology unit corresponds with a prior art alignment unit, for example as described in ~~WO 98/39689~~ U.S. Patent No. 6,297,876, which is incorporated herein by reference. Referring to FIG. 3, a substrate mark is provided in the form of a diffraction grating, P_1. An illumination beam b having a wavelength λ incident on the diffraction grating is split up into a number of sub-beams extending at different angles α_n (not labeled) to the normal on the diffraction grating, which angles are defined by the known diffraction grating formula:

$$\mathrm{Sin}\alpha_n = n\lambda/P$$

where n is the diffraction order number and P the diffraction grating period. For the further use in this document a diffraction grating is defined as a series of lines and spaces. In an intensity diffraction grating the lines and spaces have a different reflectivity, all lines having substantially equal reflectivity and all spaces having substantially equal reflectivity. When a radiation beam with flat wavefronts impinges on an intensity diffraction grating the intensity at the lines and spaces is different in the plane where the radiation leaves the diffraction grating. In a phase diffraction grating the lines and spaces have substantially the same reflectivity, but they have different refractive indices and/or different heights. When a radiation beam with flat wavefronts impinges on a phase diffraction grating the phase at the lines and spaces is different in the plane where the radiation leaves the diffraction grating.

Page 9, amend the paragraph starting in line 30 as follows:

In this plane ~~means are provided for further separating~~ the different sub-beams are further separated. To this end, a plate may be arranged in this plane, which is provided with deflection elements in the form of, for example, wedges. In FIG. 3 the wedge plate is denoted by WEP. The wedges are provided on, for example the rear side of the plate. A prism 72 can then be provided on the front side of the plate, with which an incident beam coming from the radiation source 70, for example a He-Ne laser, can be coupled into the metrology sensor. This prism can also prevent the 0-order sub-beam from reaching the detectors (the 0-order sub-beam is not desired at the detectors). The number of wedges corresponds to the number of sub-beams which is to be used. In the embodiment shown, there are six wedges per dimension plus orders so that the sub-beams can be used up to and including the 7th-order. All wedges have a different wedge angle so that an optimal separation of the different sub-beams is obtained.

Page 10, amend the paragraph starting in line 12 as follows:

A second lens system L_2 is arranged behind the wedge plate. This lens system images the mark P_1 in the plane reference plate RGP. In the absence of the wedge plate, all sub-beams would be superimposed in the reference plane. Since the different sub-beams through the wedge plate are deflected at different angles, the images formed by the sub-beams reach different positions in the reference plane. These positions X_n are given by:

$$X_n = f_2\, \gamma_n$$

in which γ is the angle at which a sub-beam is deflected by the wedge plate.

Page 10, amend the paragraph starting in line 21 as follows:

At these positions, reference diffraction gratings are provided. A separate detector 90-96 is arranged behind each of the reference diffraction gratings. The output signal of each detector is dependent upon the extent to which the image of the substrate diffraction grating P.sub.1 coincides with the relevant reference diffraction grating. The period of each diffraction grating is adapted to the order number of the associated sub-beam incident on that diffraction grating. As the order number increases, the period decreases.

Page 30, amend the paragraph starting in line 12 as follows:

The effect of the $\lambda/4$ steps is that, at the wafer surface, each line of the diffraction grating is displaced if the diffraction grating is not correctly focussed (this effect is described in ~~US2002/0021434~~ U.S. Patent No. 6,674,511, incorporated herein by reference). The displacement is dependent upon the direction of the step. This means that adjacent lines of the diffraction grating are displaced in opposite directions as a result of defocus.

Page 38, amend the paragraph starting in line 9 as follows:

Conveniently, the overlay metrology measurements may be obtained during alignment of the wafer for exposure, i.e., when the alignment unit is located over a given alignment diffraction grating for alignment purposes, it may obtain a first measurement based solely upon that diffraction grating in order to provide alignment, and may obtain a second measurement based upon a diffraction grating located in a layer above or beneath the alignment diffraction grating (or based upon a combination of both diffraction gratings) the

second measurement being used to provide overlay metrology measurements. Where a dual stage lithographic apparatus is used (i.e., the wafer is mapped in a separate stage prior to exposure, as described for example in ~~EP1037117)~~ U.S. Patent No. 6,674,510 the overlay metrology measurement may be performed without any reduction of productivity.